Pre-Activity Reading Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_ Period \_\_\_

Use the reading materials provided, online resources and/or your text book.

For the following terms provide

1. The definition
2. The formula if it exists (one that might be used in the experiment)
3. Give an example of how the term can be used
4. Tell how the term relates to your car design, negatively **or** positively
5. Tell how you can use the term to your advantage in the design of your vehicle

Terms

1. Acceleration
2. Aerodynamics
3. Alignment
4. Center of mass
5. Efficiency
6. Energy
7. Fluid Friction (air resistance, or drag)
8. Force
9. Friction points
10. Kinetic energy
11. Law of Conservation of Energy
12. Lubrication
13. Mass
14. Momentum
15. Newton’s First Law
16. Newton’s Second Law
17. Number of wheels
18. Potential energy
19. Power output
20. Pressure
21. Surface Friction
22. Torque
23. Traction
24. Velocity
25. Wheel size
26. Work

***YOU MUST CONDUCT ALL TRIALS. If the 1ST ONE IS PERFECT, VERIFY YOUR RESULTS!***

Physics: The Great Race: ***Test Run 1*** Data Table Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Mass of the bottlemobile \_\_\_\_\_\_\_\_ g

Distance Traveled \_\_\_\_\_\_\_\_ m

Average Velocity \_\_\_\_\_\_\_\_m/s

Time to travel 2 m \_\_\_\_\_\_\_\_ s

Does it maintain a straight path? \_\_\_\_\_\_\_\_

Modifications to the Bottlemobile as a result of this trial data, and reasons for each modifications:

After modifications have been made as in the above, what impact did the change(s) make on your next data?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Physics: The Great Race: Test Run 2 data** Table

Mass of the bottlemobile \_\_\_\_\_\_\_\_ g

Distance Traveled \_\_\_\_\_\_\_\_ m

Average Velocity \_\_\_\_\_\_\_\_m/s

Time to travel 2 m \_\_\_\_\_\_\_\_ s

Does it maintain a straight path? \_\_\_\_\_\_\_\_

Modifications to the Bottlemobile as a result of this trial data, and reasons for each modifications:

After modifications have been made as in the above, what impact did the change(s) make on your next data?

***YOU MUST CONDUCT ALL TRIALS. If the 1ST ONE IS PERFECT, VERIFY YOUR RESULTS!***

Physics: The Great Race: Test Run 3 Data Table Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Mass of the bottlemobile \_\_\_\_\_\_\_\_ g

Distance Traveled \_\_\_\_\_\_\_\_ m

Average Velocity \_\_\_\_\_\_\_\_m/s

Time to travel 2 m \_\_\_\_\_\_\_\_ s

Does it maintain a straight path? \_\_\_\_\_\_\_\_

Modifications to the Bottlemobile as a result of this trial data, and reasons for each modifications:

After modifications have been made as in the above, what impact did the change(s) make on your next data?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Physics: The Great Race: Test Run 4 Data Table

Mass of the bottlemobile \_\_\_\_\_\_\_\_ g

Distance Traveled \_\_\_\_\_\_\_\_ m

Average Velocity \_\_\_\_\_\_\_\_m/s

Time to travel 2 m \_\_\_\_\_\_\_\_ s

Does it maintain a straight path? \_\_\_\_\_\_\_\_

Modifications to the Bottlemobile as a result of this trial data, and reasons for each modifications:

After modifications have been made as in the above, what impact did the change(s) make on your next data?

***YOU MUST CONDUCT ALL TRIALS. If the 1ST ONE IS PERFECT, VERIFY YOUR RESULTS!***

**Physics: The Great Race: Test Run 5 Data Table** Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Mass of the bottlemobile \_\_\_\_\_\_\_\_ g

Distance Traveled \_\_\_\_\_\_\_\_ m

Average Velocity \_\_\_\_\_\_\_\_m/s

Time to travel 2 m \_\_\_\_\_\_\_\_ s

Does it maintain a straight path? \_\_\_\_\_\_\_\_

Modifications to the Bottlemobile as a result of this trial data, and reasons for each modifications:

After modifications have been made as in the above, what impact did the change(s) make on your next data?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Physics: The Great Race: Test Run 6 Data Table**

Mass of the bottlemobile \_\_\_\_\_\_\_\_ g

Distance Traveled \_\_\_\_\_\_\_\_ m

Average Velocity \_\_\_\_\_\_\_\_m/s

Time to travel 2 m \_\_\_\_\_\_\_\_ s

Does it maintain a straight path? \_\_\_\_\_\_\_\_

Modifications to the Bottlemobile as a result of this trial data, and reasons for each modifications:

After modifications have been made as in the above, what impact did the change(s) make on your next data?

Rubric for The Great Race

\_\_\_\_\_\_ 1. Complete the Data Record for each trial (at least 5 trials before qualification) with all categories filled out with modifications and impacts of changes

\_\_\_\_\_\_ 2. Term definitions, formulas, usage, advantages

\_\_\_\_\_\_ 3. Build the bottle mobile

\_\_\_\_\_ 4. Essay report linking data, design and motion based on the Scientific Method should include:

1. State your goal, materials used ?(hypothesis)
2. How you set up your bottlemobile
3. Explanation/analysis of the test runs
4. Problems you had and how you over came them
5. Was your lab successful? (conclusion)
6. Include illustration of your design, labeling the parts and describing changes which were made.
7. Using at least 13 of the following terms: (out of 13). Newton’s 3 laws of motion, Distance, Average velocity, Time, Friction, Force, Mass, Potential and kinetic energy, Torque, Input work, Output work, Efficiency





